

Appl. No. **10 027 327**

Amdt. dated December 9, 2003

Reply to Office action mailed September 9, 2003

REMARKS/ARGUMENTS

Independent claims 1, 11, and 13 have been amended to distinguish the thermoplastic composites of the claims from the sized glass fibers of JP 07-33484 (JP '484) which are treated with an acrylonitrile/styrene copolymer and aminosilane compound as sizing agents. The amended claims recite that the composite is a matrix resin containing glass fibers and is prepared by mixing the styrene copolymer (A) with the aminosilane coupling agent (C) before addition of the glass fibers. Support for the amendments is on page 1, first paragraph and page 3, last paragraph.

Claim 4 has been amended to state that the glass fibers are treated with the coupling agents having the specified formula before mixing with components (A) and (C). Claims 5 and 6 have been amended to change their dependency. Claim 7 has been amended to clarify that a graft copolymer is present in an amount up to about 35 parts by weight. Claim 16 has been amended to correct a typographical error. New claims 19 and 20 have been added wherein the glass fibers are treated with sizing agents. Support for the new claims is on page 5, lines 16-17. No new matter has been added.

Status of the Claims

Claims 1-20 are pending and under consideration. Claims 19 and 20 are added by this Amendment.

Statement of the Rejections

Claims 4, 5, and 7 - 9 stand rejected under 35 U.S.C. §112, second paragraph as indefinite. The Examiner has taken the position that, if the coupling agents of claim 1 and claims 4-5 are the same, the scope of claim 1 is not narrowed by claims 4-5. The Examiner also states that the phrase "up to about 35 parts" in claim 7 is indefinite.

Claims 1 - 3, 6, and 10 - 15 stand rejected under 35 U.S.C. §102(b) as anticipated by JP 07-33484 (JP '484). It is noted that the translation of the reference is very poor. JP '484 discloses glass fibers which are treated with a sizing agent comprised of epoxy resin, acrylonitrile-styrene copolymer resin and silane coupling agents (paragraph [006]). The sizing agent is applied to the

glass strands in amounts of 0.2 to 3% by weight of the solid content (paragraph [0007] and [0015]). The glass fibers are then prepared by drying and cutting the glass strands. (paragraph [0015]). Paragraph [0016] cited by the Examiner relates to the *subsequent* addition of the sized glass fibers to an AS matrix resin. There is no disclosure of any addition of an aminosilane to the matrix resin prior the addition of the glass fibers. The examples disclose the pretreatment of the glass fibers with a sizing agent of an aminosilane, epoxy resin, and an AS resin which are coated on the glass strands which are then dried and cut. The resulting strands are *not* thermoplastic resin composites. The chopped strands are *subsequently* added to an AS resin for reinforcement. The Examiner has taken the position that JP '484 anticipates claims 1 - 3, 6, and 10 - 15.

Claims 4, 5, 7 - 9 and 16 - 18 stand rejected under 35 U.S.C. §103 as unpatentable over JP 07-33484 (JP '484) in view of Jagawa et al which discloses the use of organic silane compounds to treat the surface of glass fibers which are used to reinforce a thermoplastic resin. There is no specific disclosure of any aminosilane compound in the reference. There is no disclosure of mixing the matrix resin with any aminosilane compound at any point in the disclosed process. The Examiner has taken the position that "there is no limitation on the mixing order" and that "polymers and additives can be pre-mixed and the rest such as glass fibers added to the mixture in molten state".

Claims 17 and 18 stand rejected under 35 U.S.C. §103 as unpatentable over JP 07-33484 (JP '484) in view of JP 05-331335 (JP '335) which discloses the pretreatment of glass fibers with an aminosilane coupling agent (paragraph [0016]) in order to improve adhesion between the glass fibers and the matrix resin. The translation of JP '335 is also very poor. The Examiner has taken the position that "[F]rom the example in [0019] it is also stated that the aminosilane surface treats the glass fibers is in the melt mixture of the pellets wherein term pellet refers to the polymers. Therefore it can be concluded that the aminosilane is added to the polymer before the glass fibers so that the glass fibers do not pre-react with silane". The Examiner then concludes that it would have been obvious to use "the process of JP '335 in the composition of '488 and thereby arrive at the present invention".

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Applicants' Traversal

Applicants traverse the rejections and respectfully request reconsideration in view of the following discussion.

Claims 1 - 3, 6, and 10 - 15 are not anticipated by JP '484 because the reference does not disclose all elements of the claims.

To Anticipate a Claim, the Reference Must Teach Every Element of the Claim

The standard for anticipation is one of strict identity. To anticipate a claim for a patent, a single prior source must contain all its essential elements. MPEP §2131 states the basic requirements for anticipation under 35 U.S.C. §102 citing relevant case law. Federal Circuit court decisions repeatedly emphasize that anticipation (lack of novelty) is established only if (1) all the elements of an invention, as stated in a patent claim, (2) are identically set forth, (3) in a single prior art reference. Federal Circuit decisions reject any standard of "substantial identity".

As cited in the MPEP, "[A] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Moreover, the elements must be arranged as recited in the claim. "It is not sufficient that each element be found somewhere in the reference, the elements must be arranged as in the claim." *Lindemann Maschinenfabrik GMBH v. American Hoist and Derrick Co.*, 730 F.2d 1452, 1458 (Fed. Cir. 1984). The elements must be arranged as required by the claim, . . . *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990). *Richardson v. Suzuki Motor Co., Ltd.*, 868 F.2d 1226, 1236-37, 9 USPQ2d 1913, 1920-21 (Fed. Cir. 1989), cert. denied, 493 U.S. 853 (1989) ("Every element of the claimed invention must be literally present, arranged as in the claim.");

As noted previously, JP '484 discloses glass fibers treated with a sizing agent comprised of epoxy resin, acrylonitrile-styrene copolymer resin and silane coupling agents (paragraph [006]). The sized glass fibers are then added to an AS matrix resin. Paragraph [0016] cited by the Examiner relates to the *subsequent* addition of the sized glass fibers to an AS matrix resin.

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In order to anticipate the claims, JP '484 must disclose every element of the claims ("The identical invention must be shown in as complete detail as is contained in the . . . claim."

Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

The sized glass fibers of JP '484 are not thermoplastic resin composites.

Applicants submit that the claims are not anticipated by JP '484 because the reference does not disclose every element of the claims. The examples of JP '484 starting at paragraph [0020] disclose the pretreatment of the glass fibers with a sizing agent containing an aminosilane, epoxy resin, and an AS resin which are coated on the glass strands. The resulting strands are sized glass strands. The sized glass fibers of JP '484 are *not* thermoplastic resin composites since the amount of the sizing agent coated on the glass fibers is well below the amount that would be required to form a composite. Independent claims 1, 11, and 13 are directed to thermoplastic resin composites. Therefore, the coated glass fibers do not anticipate Applicants' claimed thermoplastic resin composites.

The composites according to the claims which are prepared by mixing the aminosilane with the matrix resin prior to addition of the glass fibers are not the same as the composites of JP '484.

In the examples of JP '484, the chopped strands are added to an AS matrix resin *after* treatment with the sizing agent as reinforcement in the resulting composite. There is no disclosure of adding any aminosilane compound to the matrix resin *prior to* the addition of the glass fibers. Applicants' examples are evidence that the composites of the present invention are not the same as the composites of JP '484. The Examples show that mixing the aminosilane with the matrix resin prior to the addition of the glass fibers gives improved properties in the thermoplastic resin composite according to the claimed invention. Table 1 on page 9 shows that the Izod impact strength is improved and the Dupont drop tests show excellent results compared to the composites made without the mixing of the aminosilane with the matrix resin prior to the addition of glass

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fibers. Applicants submit that these results are evidence that the composites of the present invention are not the same as the composites of JP '484.

The Examiner has not established a prima facie case of obviousness of the claims over JP '484 alone or in view of Jagawa et al.

Requirements For Prima Facie Case of Obviousness

When applying 35 U.S.C. 103, the following tenets of patent law must be adhered to:

- (A) The claimed invention must be considered as a whole;
- (B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination;
- (C) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and
- (D) Reasonable expectation of success is the standard with which obviousness is determined.

Hodosh v. Block Drug Co., Inc., 229 USPQ 182, 187 n.5 (Fed. Cir. 1986).

MPEP §2143 states the basic requirements of a *prima facie* case of obviousness citing supporting case law:

1. There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one skilled in the art to modify the references or combine reference teachings. (see MPEP §2143.01)
2. There must be a reasonable expectation of success. (see MPEP §2143.02)
3. The prior art reference (or references when combined) must teach or suggest all of the claim limitations. (see MPEP §2143.03)

The fact that references can be modified or combined is *not* sufficient to establish *prima facie* obviousness. (MPEP §2143.01).

Construction of the Claims

As noted by the Federal Circuit “a determination of anticipation, as well as obviousness, involves two steps. First is construing the claim, . . . followed by, in the case of anticipation or obviousness, a comparison of the construed claim to the prior art. *Key Pharmaceuticals Inc. v. Hercon Laboratories Corp.*, 161 F.3d 709, 48 USPQ2d 1911 (Fed. Cir. 1998).

Differences Between the Prior Art and the Claimed Invention

The factual inquiries for establishing a background for determining obviousness under 35 U.S.C. 103(a) are set forth in set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966) and include determining the scope and contents of the prior art and ascertaining the differences between the prior art and the claims.

JP ‘484 discloses the use of silane compounds in a sizing agent for glass fibers. The reference does not disclose mixing the silane compound with the matrix resin prior to the addition of the glass fibers. There is nothing in the reference that teaches or suggests such a mixing step. In the Examples, Applicants have shown that the mixture of the aminosilane with the matrix resin produces a composite with improved properties. Therefore, the composites of Applicants’ claims are not the same as the composites of JP’484. As recognized by the Examiner, JP ‘484 does not disclose the addition of an aromatic vinyl graft copolymer. Jagawa et al. do not disclose the use of any aminosilane as an organic silane compound (col. 5, lines 9-12) to pretreat the glass fibers. The reference does not disclose mixing the matrix resin with an aminosilane prior to the addition of the glass fibers.

There is no motivation or suggestion in JP ‘484 or Jagawa et al. to select an aminosilane and then mix the matrix resin and aminosilane prior to the addition of the glass fibers.

There is nothing in JP ‘484 that would motivate one skilled in the art to select aminosilanes and, contrary to the teaching of the reference, mix the aminosilane with the matrix resin prior to addition of the glass fibers. JP ‘484 specifically teaches that the silane compound is added to a composition which is used as a sizing agent for the glass fibers. The glass fibers are treated prior to addition to the matrix resin. The reference teaches that a “good hue is shown highly” (paragraph

[0005]). Applicants submit that the teaching of the use of the silane as a pre-treating agent for the glass fibers *teaches away* from adding a silane compound to the matrix resin prior to the addition of the glass fibers.

The results of Examples 1-3 and Comparative Examples 1-3 show that Applicants' claimed composites have improved properties when the aminosilane is mixed with the matrix resin prior to the addition of the glass fibers. As shown in Table 2, the Izod impact strength improved and the results of the Dupont drop test show significant improvement.

Moreover, there is nothing in JP '484 or Jagawa et al. that would motivate one skilled in the art to select aminosilanes to pretreat the glass fibers. JP '484 discloses the use of silane coupling agents other than aminosilane compounds. In addition to aminosilanes, other silanes such as epoxy silanes and vinyl silanes are disclosed as equivalent coupling agents (paragraph [0011]). Jagawa et al. do not disclose the use of aminosilanes at all (col. 5, line 9-11). The Examiner has not stated any objective reason why one skilled in the art would select aminosilanes. Applicants have shown that epoxy and vinyl silanes do not produce improved results. In Applicants' Comparative Examples 4-9, epoxy and vinyl silanes are mixed with the matrix resin prior to the addition of the glass fibers but the resulting compositions do not have the improved properties of Examples 1-6 in which aminosilanes are mixed with the matrix resin.

There is no motivation or suggestion in JP '484 to use additional copolymers in the compositions disclosed therein to result in Applicants' claimed compositions.

The Examiner has not established a prima facie case of obviousness of the claims 4, 5, 7-9 and 16-18 over JP '484 in view of Jagawa et al. There is nothing in JP '484 that would motivate one skilled in the art to add a vinyl graft copolymer to the composite. Jagawa et al. requires the presence of a terpolymer containing N-phenylmaleimide having particular properties in addition to the AS resin, graft copolymer, and the glass fibers. The benefits disclosed in Jagawa et al. are obtained when the specified terpolymer is included in the composite. There is nothing in Jagawa et al. that would motivate one skilled in the art to apply its teachings to the composites of JP '484 which do *not* contain the terpolymer required by Jagawa et al.

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There is no motivation or suggestion in either JP'484 or Jagawa et al. to mix an aminosilane with a matrix resin prior to the addition of glass fibers.

Both references specifically teach that the silane compounds are used to treat the surface of the glass fibers *prior to* mixing with the matrix resin. Neither reference teaches or suggests mixing the matrix resin with an aminosilane prior to addition of the glass fibers. There is no teaching in either reference that would motivate one skilled in the art to perform such a mixing step prior to the addition of the glass fibers. Applicants submit that the specific teaching of the silane as a sizing agent for the glass fibers *teaches away* from adding an aminosilane to the matrix resin prior to the addition of the glass fibers.

The Examiner contends that “[I]n the process of Jagawa, there is no limitation o the mixing order” and that “[S]ome components such as additives can be pre-mixed . . .”. Applicants submit that there is a limitation on the addition of the silane compounds because Jagawa et al. teach that the glass fibers are treated with silane compounds prior to addition to the matrix resin. The silane compounds are *not* disclosed as additives in the composition. Therefore, one skilled in the art would not use the silane compound without first applying it to the glass fibers. There is no teaching in either reference that would lead one to expect the improved results shown by Applicants’ composites due to the mixing of an aminosilane compound with the matrix resin.

The Examiner has not provided any reasons why there would be a reasonable expectation of success from the combination of JP '484 with Jagawa et al.

The Examiner contends that “[A]ddition of the rubber components provides molding composition with increased impact strength . . .” and that utilizing a rubber and pre-treated glass fibers “would increase impact resistance and anisotropy as well as adhesion between filler and polymeric matrix”. However, the Examiner has not given any reasons why these results would be expected or that there would be a likelihood of success in the compositions of JP '484 which do not contain the terpolymer component which is required in the compositions of Jagawa et al.

Neither reference teaches or suggests improved results from the mixing of aminosilane in particular with the matrix resin. JP '484 discloses that epoxy and vinyl silane compounds are equivalent to aminosilanes. Jagawa et al. do not disclose the use of aminosilanes at all. Applicants

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have shown that the improved results are *not* obtained when epoxy and vinyl silanes are used instead of an aminosilane as component (C) in the claimed invention.

The combination of JP '484 and JP '335 does not teach or suggest the methods of claim 17 and 18 wherein an aminosilane is mixed with the matrix resin prior to the addition of the glass fibers.

Applicants submit that the Examiner has not established a *prima facie* case of obviousness of claims 17 and 18 over JP '484 in view of JP '335. As noted previously, the prior art reference (or references when combined) must teach or suggest all of the claim limitations. (see MPEP §2143.03). Neither JP '484 nor JP '335 nor their combination teach or suggest the methods of claims 17 and 18. Therefore, the Examiner has not established a *prima facie* case obviousness.

As discussed previously, JP '484 does not teach or suggest the mixing of an aminosilane with the matrix resin prior to the addition of the glass fibers. JP '335 teaches that a coupling agent such as vinyl silane or aminosilane is used to treat glass fibers (paragraph [0016]). Applicants submit that the reference does not disclose or suggest the mixing of the aminosilane with the matrix resin *prior to* the addition of the glass fibers.

The Examiner contends that:

From the example in [0019] it is also stated that the aminosilane surface treats the glass fibers in the melt mixture of the pellets, wherein term pellet refers to the polymers. Therefore it can be concluded that the aminosilane is added to the polymer before the glass fibers so that the glass fibers do not pre-react with silane.

Applicants submit that the disclosure in paragraph [0019] does *not* support the Examiner's position. The translation of JP '335 is very poor and it appears that the verbs have been separated from the related nouns. The sentence in paragraph [0019] is as follows:

The diameter by which surface treatment of the refractive index is carried out to the E glass of 1.554 by the aminosilane carried out heating melting mixture of the pellet of GF chop above (5 micrometers and 13 micrometers) PMMA and SAN with the extruder at various rates.

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There is nothing in the above sentence that supports the Examiner's statement that "pellet refers to the polymers" or her conclusion that "the aminosilane is added to the polymer before the glass fibers so that the glass fibers do not pre-react with silane". Applicants submit that nothing in the remainder of the reference that supports the Examiner's contentions. JP '335 discloses that SAN and PMMA are mixed and then the glass fibers (GF) are added (paragraph [0007]). The silanes are disclosed as being used for the surface treatment of the glass fibers (paragraph [0016]). There is no discussion of preventing the glass fiber from reacting with the silane. Applicants submit that a more reasonable interpretation of the sentence in paragraph [0019] in view of the reference as a whole is that the surface of an E glass fiber is pretreated with aminosilane to obtain a particular diameter and a mixture of the glass fiber chop, PMMA and SAN are extruded at various rates.

There is no motivation or suggestion in either JP'484 or JP '335 to mix an aminosilane with a matrix resin prior to the addition of glass fibers.

There is nothing in either reference that would motivate one skilled in the art to mix the aminosilane with the matrix resin prior to the addition of the glass fibers. Both references teach the treatment of the glass fibers with the aminosilane prior to mixture with the matrix resin.

Applicants again submit that the teaching of the use of the silane as a treating agent for the glass fibers teaches away from adding an aminosilane to the matrix resin prior to the addition of the glass fibers.

There is no motivation or suggestion in either JP'484 or JP '335 to select aminosilane as a sizing agent for the glass fibers.

Both references list aminosilane in a list of possible sizing or coupling agents that can be used to treat the surface of the glass fibers. There is no teaching in either reference that would motivate one skilled in the art to select aminosilane. There is no indication in the references that improved results would be obtained by the use of aminosilane when it is added to the matrix resin prior to the addition of the glass fibers.

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The Examiner has not provided any objective reasons to support the combination of the references.

The fact that the claimed invention may be within the capabilities of one of ordinary skill in the art is *not* sufficient by itself to establish *prima facie* obviousness. "A statement that modifications of the prior art to meet the claimed invention would have been 'well within the skill of the art' . . . is *not* sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references" (MPEP §2143.01 citing supporting case law).

There is no disclosure in JP '335 that the glass fibers should not pre-react with the silane compound. There is no disclosure in JP '335 that the silane compound has anything to do with "well dispersed glass fibers". Applicants submit that there is nothing in either JP '484 or JP '335 that would motivate one skilled in the art to select aminosilanes and then mix an aminosilane with the matrix resin in the absence of the glass fibers. Both JP '484 and JP '335 specifically teaches that the aminosilane-containing sizing agent is coated on the glass fibers. Applicants submit that the specific teaching of silane compounds as a sizing agents for the glass fibers *teaches away* from adding an aminosilane to the matrix resin prior to the addition of the glass fibers. Therefore, Applicants submit that the Examiner has not established a case of *prima facie* obviousness over the references, alone or in combination.

Applicants submit that a review of the prior art of record as a whole shows that the claims in the present application meet the requirements for patentability. It is respectfully requested that the Examiner reconsider her rejections of the claims and allow claims 1 to 20.

Respectfully submitted,

LEE ET AL

BY



Maria Parrish Tungol

Registration No. 31,720

Telephone: (202) 429-5249